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ABSTRACT

A study examining the search for university technology faculty members during 1987-88 confirmed the finding of a similar study a year earlier that universities are having a difficult time hiring qualified faculty members. One hundred forty position announcements were analyzed. The heads of those departments were surveyed to find out the status of the search and the characteristics of those hired. The response rate for the survey was 92.9 percent. The following were among the study's findings: (1) only 56.86 percent of the responding departments had filled their vacancy, which was less than the percentage of vacancies filled during 1986-87 searches; (2) the number of applications received for each position ranged from 0 to 67, with an average of 17.3 applications; (3) about 59 percent of the department heads reported receiving four or fewer applications per position from thoroughly qualified candidates; (4) about 6 percent of the responding department heads said that more than 50 percent of the applicants were not U.S. citizens, but about 20 percent of them reported no applications from non-U.S. citizens; (5) the majority of successful candidates had doctorates; (8) the most common prior experience was employment at another university; and (9) the candidates' technical expertise, teaching experience, doctorate, recommendations, and scholarly work were considered (in that order of importance) in the hiring decisions. (A list of five references is included in the document.) (CML)

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U.S. DEPARTMENT OF EDUCATION
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Research in Technology Education Series – Report #4

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Supply and Demand for University Technology Faculty: 1987-88 Position Vacancy and Search Results Analysis

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Predicting supply and demand for university technology faculty is a very complex task. The complexity is exemplified when considering the diversity of the departments listed in *Industrial Teacher Education Directory* (Dennis, 1987-88). Faculty listed in the *ITE Directory* are involved in industrial education, industrial technology, engineering technology, technical teacher education, technology teacher education, trade and industrial teacher education, and so forth. In addition to the diversity, supply and demand predictions for these faculty are complicated by rapidly changing technologies and a myriad of other variables that exist in higher education today (e.g., limited university budget resources, student enrollment fluctuations, technical expertise match, private sector competition).

Attempts have been made to study the issues and answer the questions of supply and demand for university technology faculty over the past few years (Erekson & Birks, 1986; Erekson & Gloeckner, 1986; Erekson & Gloeckner, 1987). These reports have predicted a shortage of qualified individuals to fill technology faculty positions. For the most part, the predictions of a shortage of university technology faculty were based on age distribution and retirement projections.

To add a different perspective, and more precision, to the supply/demand predictions for university technology faculty, a study of university faculty searches was undertaken in 1986-87 (Erekson & McAlister, 1988). The intent was to identify and analyze results of faculty searches conducted during the 1986-87 academic year for the departments listed in the *ITE Directory*. A major finding of this study was that approximately one third of the faculty searches were not successful, suggesting that there was great demand for faculty and a limited pool of qualified applicants willing to accept university employment. As a result, the researchers determined that an annual study of faculty searches and results would help to determine if the findings of the 1986-87 study were unique to that year or if a trend exists.

Overview of the Study

A study was conducted to analyze technology faculty searches for the 1987-88 academic year. This study included two major activities: (1) compiling and analyzing position vacancy announcements and (2) determining the success rate for the faculty searches. The major research questions for this study were:

- What were the areas of expertise being sought?
- What were the desired qualifications for faculty?
- Were the searches successful?
- What were the characteristics of the successful candidates?
- What factors were important to department heads when hiring new faculty?
- What were the perceptions of department heads as to how difficult it has been to employ faculty?

Section 1.0 — Position Vacancy Analysis

One hundred forty faculty position announcements were identified for searches being conducted by the departments listed in the ITE Directory during the 1987-88 academic year. These faculty position announcements were obtained through direct mail and/or located in *The Chronicle of Higher Education.* Each position announcement was analyzed to determine the:

- technical specialty of the position
- rank being offered
- degree required
- industrial and/or teaching experience required

Technical Specialties

What types of faculty positions were advertised in 1987-88? Most of the positions advertised in 1987-88 were for faculty with technical expertise. The technical areas with the greatest demand were:

- Manufacturing (including CAM/Robotics) (N = 21)
- Graphics Arts/Communication (N = 15)
- Electronics (N = 12)
- CAD/Drafting/Design (N = 11)

These positions of greatest demand accounted for 59 (42.14%) of the 140 announcements. Other technical expertise areas identified in the 1987-88 vacancy analysis included Industrial Technology (N = 8), Construction Management (N = 8), Power/Energy/Transportation Technology (N = 4), Automotive (N = 3), Polymer Technology (N = 2), Metals (N = 2), Aeronautical Technology (N = 2), Quality Assurance/Control (N = 2), Wood Technology (N = 2), Welding (N = 1), Safety (N = 1), Engineering Technology (N = 1), and Industrial Management (N = 1). Several of the position announcements indicated a desire for a person with multiple areas of technical expertise. In most instances the technical areas were complementary (e.g., CAD/CAM/CIM; Graphic Arts/Communication Systems).

Although there was great demand for technical faculty, there was also a demand for teacher education faculty. The teacher education/professional positions accounted for about 19% of the positions advertised in 1987-88. They included nine advertisements for Trade and Industrial Education faculty, seven advertisements for Technology Education faculty, six advertisements for Vocational Education faculty, three advertisements for faculty to teach professional courses, and two advertisements for Industrial Arts faculty.

The other positions advertised that did not fall under the categories of technical positions or teacher education positions included; sixteen searches for administrators (department heads/chairs or deans), one search for an adult education faculty member, and one search for a curriculum specialist.

Academic Rank Advertised

The academic rank listed in the position announcements indicated that most departments were seeking assistant professors (N = 23) or assistant/associate professors (N = 36) (see Figure 1.1). Only two searches were identified specifically for full professors, one search for a full/associate professor, and two searches for associate professors. However, 38 searches (35.2%) listed rank as "commensurate with qualifications" (open rank) which allowed the possibility of hiring a senior faculty member. Twenty-two of the announcements did not specify rank.

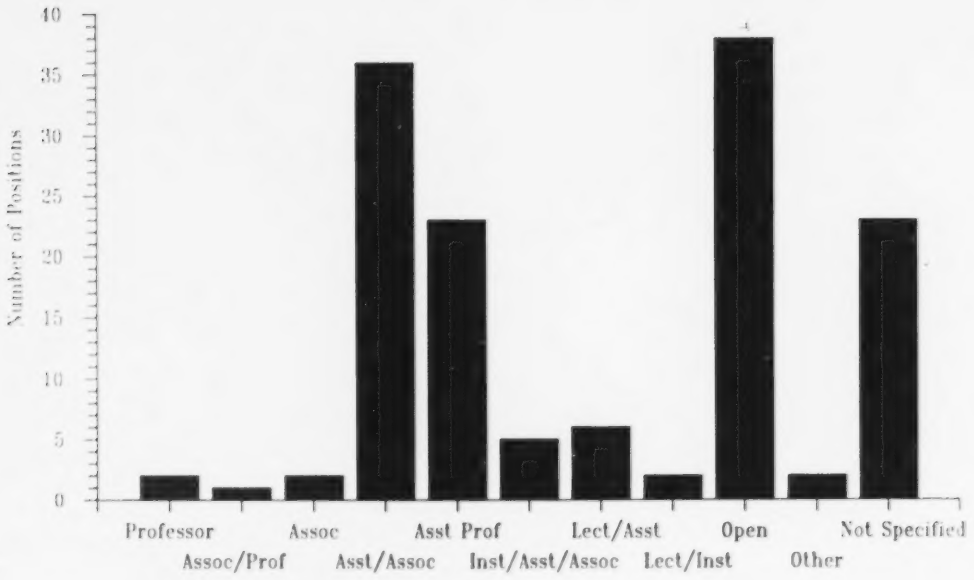

Figure 1.1: Academic Rank Advertised

Degree Advertised

The majority of position announcements (73.6%) indicated a requirement or a preference for the applicant having completed the doctorate (see Figure 1.2). Specifically, 40 (28.6%) indicated the doctorate was required and 73 (52.1%) indicated that the doctorate was preferred.

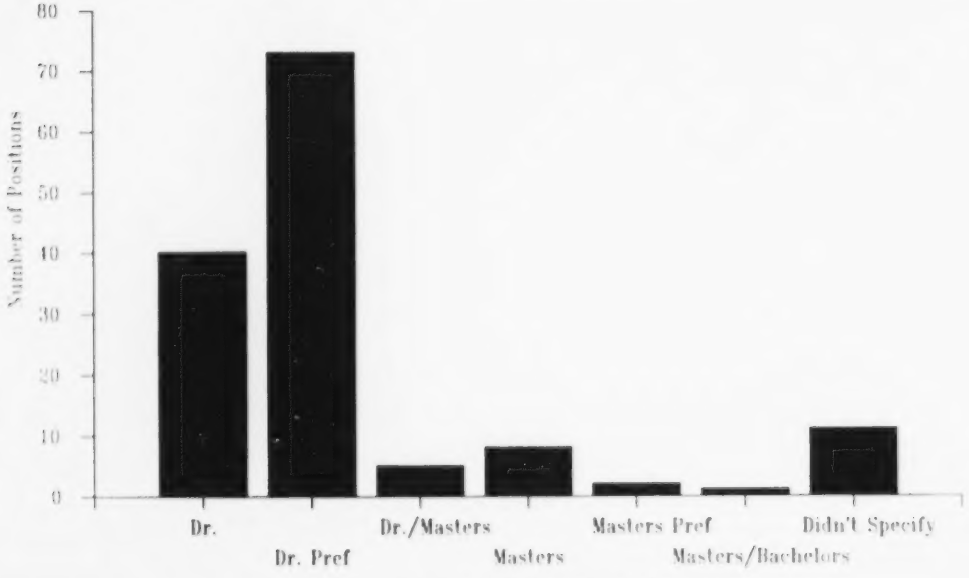

Figure 1.2: Degree Advertised

Industrial/Teaching Experience Desired

Most of the position announcements (N = 101, 72.1%) listed a preference for the successful candidate to have teaching experience. Seventy-five (53.6%) of the position announcements listed industrial experience as a desired qualification. In several instances, both industrial and teaching experience were desired.

Section 2.0 – Vacancy Status

To determine the success for each search, the department heads at the colleges/universities with vacancies were surveyed by mail during the summer of 1988. One questionnaire was sent to the department heads for each position vacancy that was identified. The questionnaire requested answers to the following questions:

- Was the position filled? If not, will a faculty search be conducted in 1987-88 for the position?
- How many applications were received for each position?
- How many applicants met the advertised qualifications?
- What was the highest degree held by the successful candidate?
- How many applicants were not U.S. citizens?
- What type of position did the successful candidate have immediately before accepting employment?
- What factors were important in hiring the faculty member?
- How difficult has it been to employ university faculty?

Of the 140 position vacancies identified, results were obtained for 130 (92.9%) of the searches. The following narrative and selected charts and tables present the findings of the study.

Status of 1987-88 Faculty Searches

Of the 140 faculty searches, it was reported that 81 (56.86%) of the positions were filled, 46 (32.86%) were not filled, two were pending announcement, one search was canceled, and no response was received for ten searches (see Figure 2.1). Of the 46 positions not filled, 38 of the department heads in-

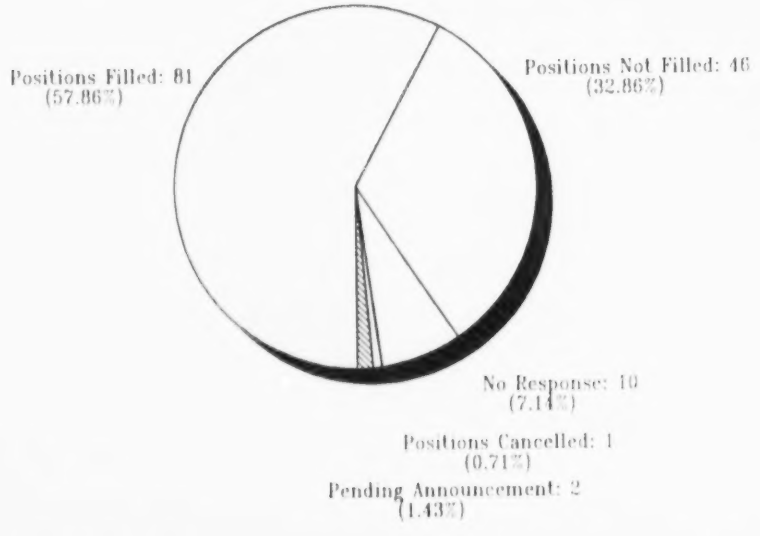

Figure 2.1: Status of 1987-88 Technology Faculty Searches

Number of Applicants

The average number of applications received for each position was 17.3 with a range of 0 to 67. The number of applicants per position was as follows: less than ten applications were received for 37.82% of the searches, 10-19 applications were received for 28.57% of the searches, and 33.61% of the searches received 20 or more applications (see Figure 2.2). These findings suggested that the pool of applicants was not large, with nearly two-fifths of the searches receiving less than ten applications. It should be noted that these findings do not indicate how many applicants applied for more than one position.

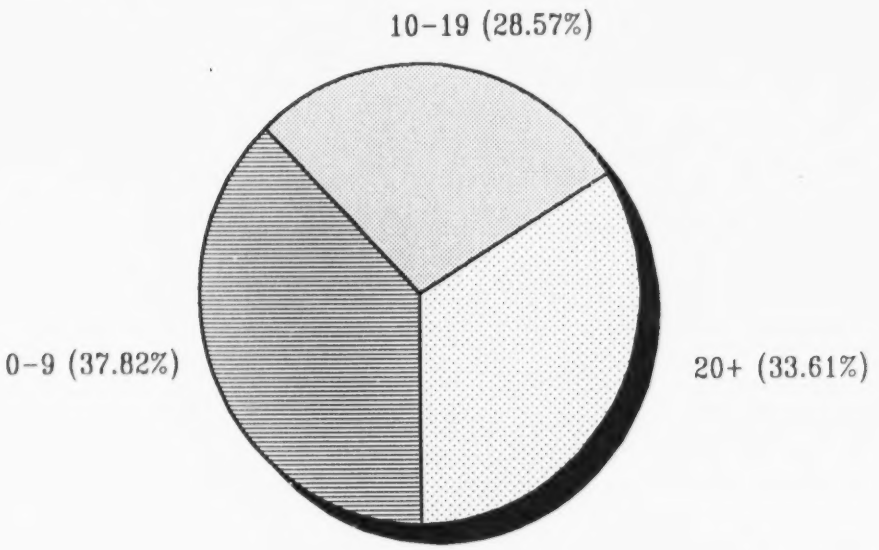

Figure 2.2: Number of Applications Received

Number of Qualified Applicants

When asked how many of the applicants met all the qualifications listed in the announcement, more than one half (55.09%) of the respondents reported that they received four or less applications per position from candidates that they felt met all the qualifications advertised (see Figure 2.3). Slightly more than one fourth (27.97%) of the respondents reported that they received two or fewer applications from fully qualified applicants. This suggests a lack of fully qualified applicants or unrealistic qualifications listed in the announcements. Nevertheless, it presents a serious situation because it indicates that there is a limited pool of qualified applicants seeking university employment from which to select faculty. Sometimes in situations like this, faculty may be employed who do not meet the desired qualifications.

Citizenship of Applicants

When conducting the 1986-87 search results survey, a few department heads suggested that data be collected to determine the number of applicants who were not U.S. citizens. Therefore, a question regarding U.S. citizenship was included in the 1987-88 survey. Eight of the department heads reported that more than 50% of the applicants were not U.S. citizens. On the other hand, 29 of the department heads reported no applications from non-U.S. citizens. The number of non-U.S. citizen applications is presented in Figure 2.4.

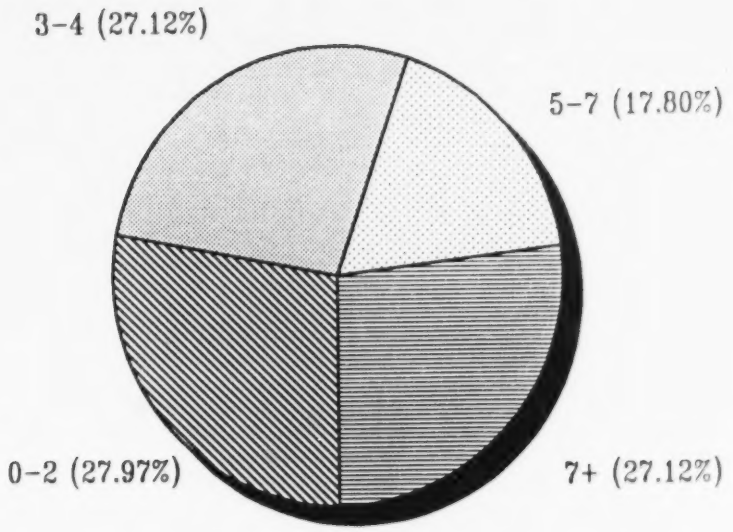

Figure 2.3: Number of Qualified Applicants

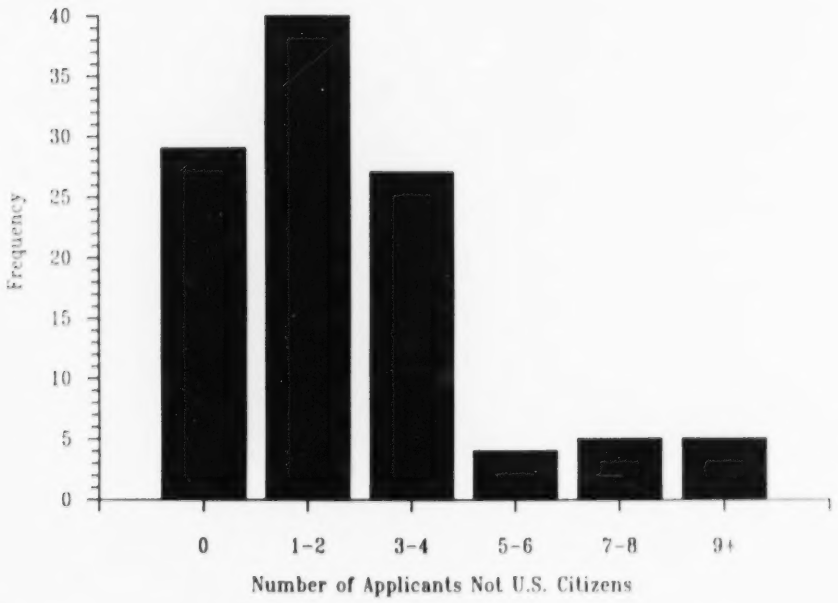

Figure 2.4: Number of Applicants Not U.S. Citizens

Highest Degree of Successful Candidates

The majority of the successful candidates had attained the doctorate (N = 36, 44.4%) while an additional 17 candidates (20.9%) had completed "all but dissertation" (ABD) for the doctorate (see Table 2.1). Twenty-six positions (32.1%) were filled with candidates who had attained the master's degree and the remaining two positions (2.5%) were filled by candidates who held the bachelors degree.

Nineteen (23.5%) of the positions were filled by candidates who did not meet the preferred educational requirements stated in the position announcements. When conditions are such that several positions (23.5%) are filled with faculty who hold lower than preferred educational credentials, a shortage of fully qualified candidates might be implied.

Table 2.1: Highest Degree of Successful Candidates by Degree Preferred

	Highest Degree of Candidate Employed			
	Ph.D./Ed.D.	A.B.D.	Masters	Bachelors
Degree Advertised				
Doctorate	17	1	3	
Doc. Preferred	14	13	14	2
Doc or Masters		2	1	
Masters	1	1	2	
Masters Preferred			2	
Masters or Bach.			1	
Not Specified	4		3	
Total	36	17	26	2

Rank of Successful Candidates

The rank most often awarded was Assistant Professor (N = 43, 53.1%) (see Table 2.2). Eighteen (22.2%) new faculty were granted rank of Associate Professor and three (3.7%) were granted the rank of Professor. Sixteen of the successful candidates received the rank of Lecturer or Instructor.

Table 2.2: Rank of Successful Candidates by Rank Advertised

	Rank of Successful Candidate				
	Professor	Associate	Assistant	Lect./Inst.	Other
Rank Advertised					
Professor	1				
Assoc/Full					
Assoc		1			
Assoc/Asst.		5	15	3	
Assistant		1	10	1	
Assoc/Asst/Lecturer		2	2		
Asst/Lecturer		1	2	2	
Lecturer/Inst.				1	
Open Rank	1	7	8	5	
Does not Specify	1	1	6	4	
Other					1
Total	3	18	43	16	1

Tenure Status

The majority of the successful candidates (N = 69, 85.2%) were employed in tenure track faculty lines. Fifty-one of the announcements indicated that the faculty position was tenure track while 20 announcements did not indicate whether the position was tenure track or not. Table 2.3 presents the findings of tenure track status for successful searches.

Table 3.2: Tenure Track Status for Successful Searches

	Tenure Status of Successful Candidate	
	Tenure Track	Non-Tenure Track
Tenure Status Advertised		
Tenure Track	49	2
Non-Tenure Track	3	7
Not Specified	17	3
Total	69	12

Prior Position of Successful Candidates

The successful candidates held various positions prior to accepting the appointment. The most common prior position was employment at another university (N = 29, 35.8%) (see Figure 2.5). About one fourth (23.5%) of the new faculty were previously employed in the private sector. Likewise, about one fourth (23.5%) were university students immediately prior to employment.

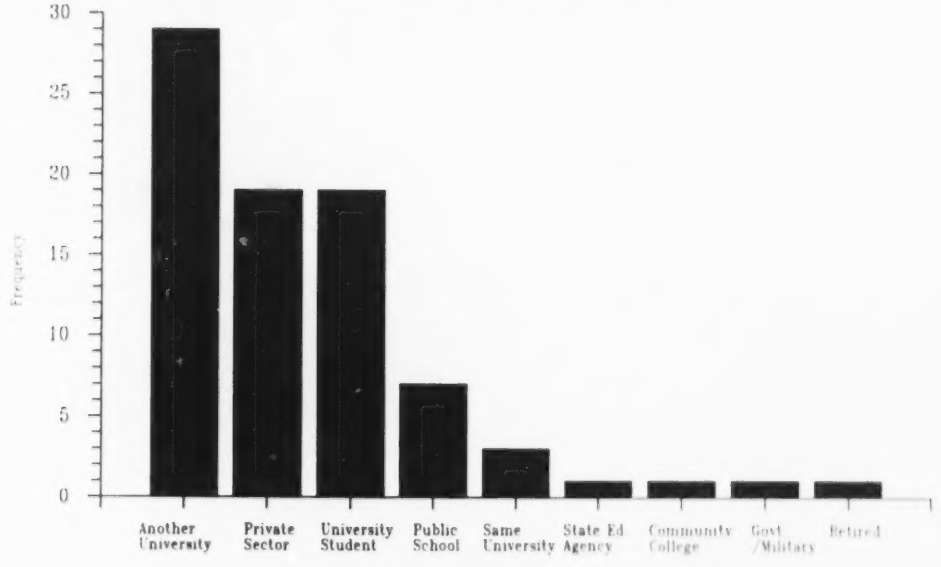

Figure 2.5: Prior Position of Successful Candidates

With several faculty being hired away from other universities, additional position vacancies are likely created. However, this factor may suggest that some institutions preferred to hire experienced faculty. It may also suggest that faculty are willing to move.

Factors Important When Hiring Faculty

Each department head was asked to rank the following six factors as to their importance when hiring faculty members: earned doctorate, technical expertise, teaching experience, industrial experience, scholarly work (publications, presentations, etc.), and recommendations. Technical expertise was ranked first as the most important factor influencing the hiring of faculty. The second most important factor was teaching experience followed by industrial experience, the doctorate, recommendations, and scholarly record. It should be noted that many of those surveyed indicated the importance of all of the factors listed and that just because one may have been ranked lower than the others, it did not understate its importance in the selection process.

Difficulty Filling Positions

Each of the department heads surveyed was asked to indicate how difficult they thought it was to employ university faculty. A scale of one to ten was used where one indicated that it was "very difficult" to employ university faculty and ten indicated that it was "not at all difficult." The average response was 3.379 on the ten point scale, which indicated that the departments listed in the *ITE Directory* have been experiencing difficulty in employing faculty. The distribution of responses is presented in Figure 2.6.

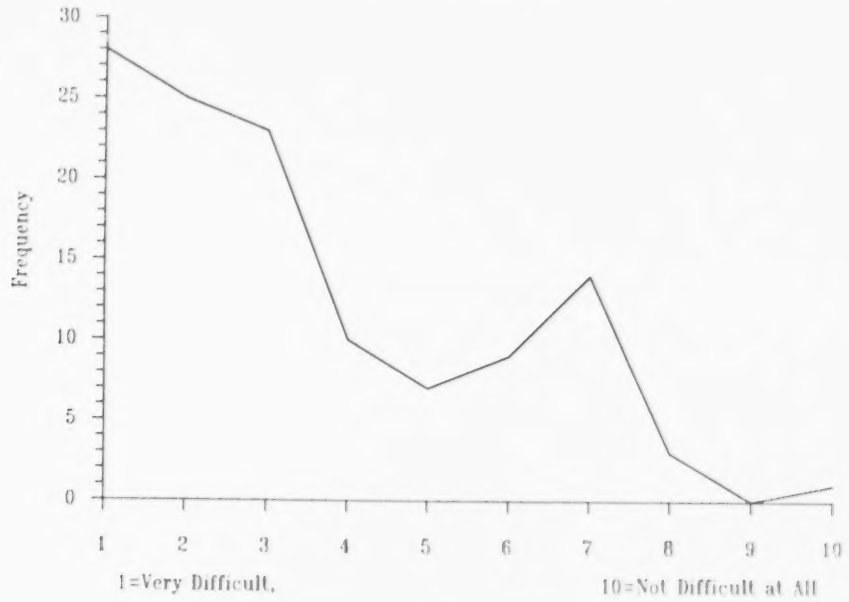

Figure 2.6: Difficulty Filling Positions

Conclusions

The findings of this study indicate that universities are continuing to have difficulty hiring qualified faculty members. Thus, this study tends to substantiate the predictions of a shortage of qualified candidates to fill university technology faculty positions that have been reported in issues of *Industrial Education* (Erekson & Birks, 1986; Erekson & Gloeckner, 1986; Erekson & Gloeckner, 1987). However, the success, or lack of success, in filling faculty positions is a very complex issue. Factors such as salary,

geographic location, institutional prestige, teaching loads, facilities and equipment, and types of programs affect the desirability of positions and the success of universities in filling positions.

It should be noted that this research report provides a one-year look at the university position vacancies and the success of faculty searches. However, the findings of the 1987-88 study were strikingly similar to the findings of a 1986-87 faculty search study (Erekson & McAlister, 1988). For example, most of the position announcements during 1986-87 and 1987-88 were for faculty to teach technical subjects (e.g., Manufacturing, CAD/CAM). Also, the percentage of the positions not filled in 1987-88 (32.86%) was almost identical to the percentage of positions not filled in 1986-87 (32.35%). The percentages of searches with less than ten applicants were also almost identical in both studies (1986-87 = 37.82%; 1987-88 = 36.07%). However, there were fewer qualified applicants per search in 1987-88 (55.09% with 4 or fewer qualified applicants) as compared to 1986-87 (39.13% with 4 or fewer qualified applicants). Likewise, in both studies it was found that more candidates were hired away from another university than any other type of previous position.

Most of the university faculty searches were for technical teaching positions. However, the findings of both studies suggest that the demand will be greater for faculty with expertise in the new and emerging technologies. There were few faculty searches for faculty in the traditional areas of woods and metals. Therefore, individuals interested in university employment should develop technological expertise and obtain the requisite educational credentials.

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